

What is claimed is:

1. A control apparatus of a hydraulic valve for holding load, comprising:

a hydraulic pump connected to an engine;

an actuator connected to the hydraulic pump;

5 a directional control valve disposed between the hydraulic pump and the actuator and switchable by pilot pressure from a remote control valve and adapted to control a start, stop and direction change of the actuator;

a poppet disposed between the directional control valve and the actuator and adapted to preclude momentary drop of load in the actuator;

10 a holding valve block connected to a downstream side of the poppet and having a sub-spool switchable by pilot signal pressure applied thereto and adapted to release upheld load of the actuator; and

15 a drain line adapted to allow hydraulic fluid returned during a switching operation of the sub-spool to flow in a pilot line of the side of a drain corresponding to the opposite side of a pilot line adapted to pressurize the spool of the directional control valve.

2. The apparatus of claim 1, further comprising a piston installed in an opposite side of a valve spring of the sub-spool and movable by pilot pressure for  
20 thereby switching the sub-spool.

3. The apparatus of claim 2, further comprising:

25 a first poppet opened during a switching operation of the sub-spool as the piston is moved and formed integrally with the sub-spool for thereby supplying hydraulic fluid of a back chamber to a return line of the actuator; and

a second poppet openably and closably installed between the sub-spool and the return line of the actuator and operating in cooperation with the first poppet.

4. A control apparatus of a hydraulic valve for holding load, comprising:

a hydraulic pump connected to an engine;

an actuator connected to the hydraulic pump;

a directional control valve disposed between the hydraulic pump and the  
5 actuator and switchable by pilot pressure from a remote control valve and  
adapted to control a start, stop and direction change of the actuator;

a poppet disposed between the directional control valve and the actuator and  
adapted to preclude momentary drop of load in the actuator;

a holding valve block connected to a downstream side of the poppet and having  
10 a sub-spool switchable by pilot pressure applied thereto and adapted to  
release upheld load of the actuator; and

a drain line formed in the interiors of the holding valve block and the directional  
control valve, and adapted to allow hydraulic fluid returned during a switching  
operation of the sub-spool to flow in a pilot line of the side of a drain  
15 corresponding to the opposite side of a pilot line adapted to pressurize the  
spool of the directional control valve.

5. The apparatus of claim 4, further comprising a piston installed in an  
opposite side of a valve spring of the sub-spool and being moved in accordance  
20 with pilot pressure for thereby switching the sub-spool.

6. The apparatus of claim 4, wherein said drain line includes:

a first drain line communicating with a back chamber formed between the piston  
and the sub-spool and formed in the interior of the holding valve block;

25 a second drain line having one end connected to the first drain line and formed  
in the interior of the directional control valve; and

a third drain line communicating with the other end of the second drain line and

communicating with the pilot line of the side of the drain corresponding to the opposite side of the pilot line adapted to pressurize the spool of the directional control valve.

5        7.        The apparatus of claim 1, wherein said drain line includes:

a first drain line communicating with the back chamber between the piston and the sub-spool and formed in the interior of the holding valve block; and

a fourth drain line having one end communicating with the first drain line, and the other end communicating with the pilot line of the side of the drain  
10        corresponding to the opposite side of the pilot line adapted to pressurize the spool of the directional control valve.

8.        The apparatus of claim 5, further comprising:

a first poppet opened during a switching operation of the sub-spool as the piston  
15        is moved and formed integrally with the sub-spool for thereby supplying hydraulic fluid of a back chamber to a return line of the actuator; and

a second poppet openably and closably installed between the sub-spool and the return line of the actuator and operating in cooperation with the first poppet.